

Olmstead (A.)

ELEMENTS OF

ELECTROPATHY,

WITH

RULES AND DIRECTIONS

FOR THE APPLICATION OF

OLMSTEAD'S IMPROVED VOLTAIC ARRANGEMENT:

PATENTED 17TH APRIL, A.D., 1849.

FOR

MEDICAL, CHEMICAL, AND PHILOSOPHICAL PURPOSES.

BY

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P R E F A C E .

Electropathy demands a text-book. Such a treatise is in a course of elaboration, but some brief instructions have been found necessary in advance, to accompany the apparatus, of which the author is the inventor and patentee.

The brief Rules and Directions here given, are designed only to aid private families in the absence of medical advice, in the use of Olmstead's Voltaic Arrangement for Medical Purposes. Families having their regular physicians, it is presumed, will always use the apparatus, under their advice, when practicable.

The Art of Medicine is the application of the principles of medical science to the preservation of health, and in the cure of disease.

The perfection and success of the Art depends upon the perfection of the Science. "It is the office of all sciences," says Lord Bacon, "to shorten the long turnings and windings of experience."

The Science of Medicine is a system of laws deduced

from the facts collected by the experience of mankind. These laws fairly demonstrated by induction from sufficiently extensive observation, partake of the nature of facts, and the knowledge of them, makes the experience of mankind, to that extent, the experience, in some sense, of any person, who learns this system of laws.

This fact explains the secret of progression in Science and Art, by which one generation is made wiser than another, learning wisdom from its ancestry.

The history of Medicine, as a Science, and as an Art, would else be narrowed to the record of the experience of the first individual of the race who adopted a curative process.

The Art of Medicine, appropriates as its own, whatever can be made available to its purposes in the various sciences in the vast circle of human knowledge.

Electropathy, as a Science, embraces all the phenomena developed by Electricity, in Anatomy, Physiology, Pathology and Chemistry.

It is submitted respectfully, whether Electropathy does not claim a distinct Professorship in our Medical Universities and Medical Colleges?

Such a chair, properly filled, might avail itself of the results of the researches and experience of Cavallo, Priestly, Ferguson, Bird, Page, König, Curraro, Cloquet, Addison, Montault, Gondret, Pouillet, Ure, Brand, Pearson, Davy, Farraday, and other foreign ornaments of Medical Science and Literature, and in our country

might be named Dunglison, Pancoast, Gerhart, Jackson, Gibson, Micthell, Mütter, Knight, and Ives, all of whom bear testimony to the therapeutic efficacy of electricity when properly communicated.

Electrotherapy asks only to be subjected to the infallible test of sufficient demonstration, and rests its claims upon the multitude of facts in the history of the Electropathic treatment of diseases, in which its curative efficacy has been so uniformly and wonderfully developed.

It must be understood, however, that the name of Electrotherapy is not applied by the author to any form of administering electricity by means of any other machines than those involving in their construction, all the principles of Olmstead's Improved Voltaic Arrangement. All other machines only serve to show the want of proper apparatus by which to communicate Electricity medicinally.

Electrotherapy repudiates shocks, sparks, and irregular electrization, even without shocks or sparks; and recognizes only the communication of electricity in a breathing, flowing, gentle, pleasant stream, analagous to the circulation of the blood.

Of the possibility of communicating electricity in this most mild, regular and controllable manner, by Olmstead's Improved Voltaic Arrangement, no proof will suffice but demonstration; and a few minutes operation will satisfy the most sceptical of the fact.

Physicians and others are therefore invited to test the fact experimentally.

It removes tension by equalizing the circulation, relieving the brain or other viscera, invigorating the vital energies, and supporting the constitution, giving a natural healthy action to the whole system. It removes retension by its action on the glandular and muscular tissues, in promoting all the various secretions and excretions of the living human body.

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ELECTROPATHY.

INTRODUCTION.

Historical Synopsis of Discovery and Invention in Electricity, as a Science and Art, particularly in its application to Medical purposes.

The science of electricity is inductive. Its history, therefore, is the simple record of the facts indicating its existence, nature, phenomena and laws.

That amber, when submitted to friction, is capable of attracting and repelling other material substances, was a fact known to the ancients, but by whom discovered, and at what precise period of the history of the world, is unknown. So early as B. C. 600, Thales of Miletus, Theophrastus, B. C. 321, and Pliny, A. D. 70, described these phenomena, the last of whom also ascribes the same property to turmaline, or lopes lyncuries, a mineral substance.

Both Pliny and Aristotle afford evidence that the ancients were not ignorant of the animal electricity exhibited in the torpedo.

It is also recorded that Anthero, of Tiberius, was cured of the gout by simple electricity, and that Wilimer, the king of the Goths, could emit sparks from his body.

Similar facts are noted as early as A. D. 415, by Eustathius.

Such was the state of the science of electricity at this

period of its history, when the darkness of the mediæval period of modern history shut up mankind to the mere sepulchral echoes of ancient philosophy for a thousand years, or more properly, for twelve centuries.

About A. D. 1600, Dr. Gilbert submitted to the test of experiment the facts and observations of the ancients, which he found transmitted down through the dark ages, and by superadding other discoveries of facts, and reducing the whole to a system, by the classification of the facts exhibiting its phenomena, electricity became a branch of philosophy, and a distinct science.

After the lapse of three-quarters of a century, in A. D. 1675, the discoveries of Mr. Boyle, and those of his cotemporary, Otta Guerick, particularly that of electrical light, enriched still further the infant science.

The first electrical machine was invented by Sir Isaac Newton, who also contributed a knowledge of other facts and experiments.

Mr. Frances Hawksbee, by his experimental researches, added the knowledge of many new facts to the science, in his communications to the Royal Society, especially those experiments by which he demonstrated the identity of electrical light, with that emitted by mercurial phosphorus.

Similar experiments were made by Mr. Gray and Dr. Wall.

The discovery of two different kinds of electricity, was made by Dr. Dufay, A. D. 1733 ; the one he styled *vitreous*, and the other *resinous*.

This was followed, in A. D. 1745, by the invention of the Leyden Jar.

Sir William Watson, soon after, among his various

experiments, fired gun-powder by the electric spark, and with the addition of a little camphor to the powder, discharged a musket by electricity, and added numerous other experiments, by which he tested and illustrated its effects, both upon animal and vegetable life.

These discoveries were soon followed by numerous experiments designed to test the properties of electricity, as a therapeutic agent, in the practice of medicine, especially as to its power over the pulse, by Doctor's Robison, Van Marum, Morgan, Cavendish, Trembley, Baze, Abbi, Nullet, and others.

These experiments, while they discovered no appreciable acceleration of the pulse by the application of electricity, yet revealed its potency in the mastery of disease, to such an extent, that the more learned and sober of the medical profession, adopted its use, in their practice, as a most valuable auxiliary in the healing art, while those of the profession who were naturally sanguine in their dispositions, regarded it as an universal medicine, which might be exhibited in every form of disease, with most decided benefit.

It is to be regretted that the empiricism of a few of that class who are always ready to seize upon whatever may serve as a pretext for quackery, should have discouraged by their abuses of the discoveries of science, at least for a considerable space of time, the more modest and better qualified, and scientific faculty, from that attention to the subject which its intrinsic importance demanded.

The identity of lighting with artificial electricity was demonstrated by Dr. Franklin, A. D. 1747, who established the theory of *plus* and *minus* electricity, and maintained

that electricity is not *created* by friction, but is only *collected from a state of diffusion* through other matter by which it is attracted.

His various experiments, and his invention of the lightning-rod, need not be enumerated. His discoveries marked a new era in the history of the science of electricity. The philosophers of Europe, awoke with fresh vigor, to patient, laborious, and indefatigable researches in this department of philosophical inquiry.

The discovery of Galvani, A. D. 1790, was followed by the invention of the Voltaic Pile, by M. Volta, of Como, A. D. 1800. The cultivation of the new science of Voltaic-Electricity in its various applications to other branches of science, and of art, and the splendor of the phenomena which it revealed, by the experiments of Nicholson, Cuthbertson, Bennet, Morgan, Finley, Sir Humphrey Davy, and others, not only gave it popularity, but by its association with chemistry and other sciences, invested it with the very highest importance.

Electro-Magnetism was discovered by Professor Orsted, of Copenhagen, in 1820. By its means the circular motion of the Voltaic current and the polarity of its revolutions was demonstrated.

Thermo-Electricity was discovered in 1822, by Dr. Seebeck.

The discovery of Dr. Farraday in the same year, of the revolution of the electrical current around a magnet, and his subsequent discoveries, won for him the very highest honor among electrical philosophers.

M. Peltier discovered in 1833, a power of transforming the quantity of electricity into intensity, and of intensity into quantity, and to neutralize two similar currents,

proceeding always from the same cause, by making them interfere in opposite directions.

Volumes would be necessary to record, describe, and illustrate all of the various discoveries and inventions in the several branches of electrical science and art. Suffice it to simply refer, summarily, to the invention of the Galvanic Deflagrator, in 1820, by Professor Hare, and the various modifications of the voltaic arrangement by Children, Professor Daniel, Mr. Smee, Professor Grove, Drs. Sherwood, Morehead, Grante, Hitt, Pike, and Mr. Coad's modification of Children's, together with the inventions in Electro-Magnetism in its application to telegraph purposes.

The knowledge of electricity, as a medicinal agent, existed, at least, as early as the beginning of the fifth century of the Christian era, and was revived about the beginning of the seventeenth century. Its practice was popular in the eighteenth century, and Cavallo, Priestly, Ferguson and others, assigned to medical electricity distinct chapters in their philosophical works on electricity. Its curative effects, as reported by them, and by numerous other medical philosophers and practitioners, were truly wonderful, especially if it be remembered that the progress of discovery had not produced the invention of instrumental machinery adapted to use in the application of electricity to medical purposes.

From many years practice in voltaic electricity in the cure of diseases affecting the dissolution of the human body, using various batteries of different construction, the author found by experience that in order to insure success, two great and indispensable principles must be obtained. 1. A battery must be so constructed that sure

dependence can always be placed upon its constant, regular, and permanent action. 2. It must be so arranged as to give to the operator the most perfect control over the quantity and power of its influence.

In 1848 he constructed an instrument fully accomplishing all that his experience had taught him to desire, for which he received Letters Patent, bearing date the 17th day of April, A. D. 1849, as "Olmstead's Improved Voltaic Arrangement for Medical and other Purposes."

By means of this apparatus it has been demonstrated that electricity can be communicated to the body, in all cases, and in all stages of disease, with pleasurable emotions, alike, to the tenderest infant, the most delicate female, and the most masculine constitution; quickening the pulsations of life, equalizing the circulation, promoting and regulating the secretions, producing a determination to the surface, exciting perspiration, both sensible and insensible, aiding respiration, and promoting healthful action in all the organs of vitality; acting locally and specifically, while it acts generally upon the whole system.

ELECTROPATHY DEFINED.

Electricity, as a general science, is classified into—

I. Ordinary Electricity, or that which is developed by friction.

II. Galvanism, or that which is produced by chemical action.

III. Magneto-Electricity, or that which is developed by magnets.

IV. Thermo-Electricity, or that which is developed by heat.

While Electropathy involves all the principles of the general science of electricity, it is deduced chiefly from the department of Galvanism, or Chemical Electricity.

The sole elements of knowledge are facts, truths, and principles. Obliterate all facts, truths and principles from the human mind, and all human knowledge is annihilated. Knowledge, therefore, is demonstrable. All science pertaining to matter is inductive. Its facts are cognizable by the senses. The analysis and classification of its demonstrable phenomena, develop and embody into a system its principles, by means of which other similar facts may be discovered by inductive research and experimental demonstration.

Electricity is a fact, a truth, and a principle. Its phenomena have originated a system of scientific facts, truths and principles, which comprises within itself all the systems of the natural sciences. By a figure of speech, all of the wheels of nature throughout the whole material universe, may be said to revolve within the wheel of electricity. So far as experimental demonstration in philosophy has extended the boundaries of human knowledge, the existence of electricity is developed in every molecule of matter in the universe, both in its negative and positive state.

What is then electricity? It is only definable by the properties of its phenomena, its laws, and its effects. What else in nature is otherwise definable? The only difference consists in the paucity of human knowledge, and the want of analogies, either in the natural, intellectual, moral, or spiritual world.

The inertia of matter, the phenomena of motion, and the fact that in all known cases of motion, the presence

and operation of electricity is invariably demonstrable, originates naturally the inquiry, whether motion be not dependent upon electricity? The question has even been reversed, but not wisely, since electricity is demonstrated to exist in all inert matter in the absence of all known motion.

The universal presence of electricity in all vegetable and animal substances, and the fact demonstrated of the invariable cessation of their vitality by the disturbance, to a certain extent, of the equilibrium of the electricity discoverable in their vital state, suggests, not unnaturally, the inquiry, whether both vegetable and animal life be not dependent for their existence upon electricity?

The influence of electricity in decomposition, recombination and assimilation, is not only demonstrable by its effects shown in chemical electricity, in its action on spheres, planes, and bodies of other forms, either solid or fluid, but upon the healthy living animal in the phenomena of digestion and assimilation.

After the extinction of vegetable or animal life, the substance of the body is either decomposed or petrified by chemical electricity.

It is demonstrable that in every case of disease, whether functional, organic, local or general, in the living animal, particularly the human subject, there is an appreciable interruption of the electrical equilibrium.

The fact demonstrable of the power of galvanism to excite the organs of the stomach to perform all the functions of digestion, even after dividing its nerves; and of its power to resuscitate life, in cases of suspended animation; and to impart to the dead body all the muscular motions peculiar to it in life, and countless other facts de-

veloped by the mutual application to each other of the facts and principles of Electro-Chemistry, Electro-Anatomy, Electro-Physiology, Electro-Obstetrics and Electro-Surgery, have established, inductively, a system of Electro-Pathology, Electro-Therapeutics, or Electropathy.

Electropathy, therefore, is that branch of medicine which treats of electricity, in its application as a means, in the cure of disease; and of the reasons of its application, as deduced from Pathology, Physiology and Chemistry, as well as from the results of experimental demonstration and induction from the facts developed in the history of the Electropathic treatment of diseases.

ELECTROPATHIC PRINCIPLES AND PRACTICE.

1. DISEASE.

1. *Definition*.—"An aberration of function, or structure, or size of one or more organs, or of the quality of the fluids, from the sound state, rendering assistance necessary," may be termed DISEASE. From this definition, it is evident that disease is a *state* or *condition*, and not a principle.

2. *Ratio Medendi*.—Hence, medical philosophy may be summed up into one general proposition, namely, that the only office of the Healing Art is, to *assist Nature*—(the *Vis Naturæ Medicatrix*,) to resist the ravages of disease, and so restore the system of the sufferer to a healthy state.

2. CLASSIFICATION OF DISEASES.

"The classification of diseases had arrived," says Alison, "to some degree of perfection before much pro-

gress had been made either in Physiology or Pathology, but this mode of treatment has never been found a sufficient guide for practice. By such arbitrary rules, the practitioner is always liable to be misled, as cases are widely separated which depend on the same action. It is often found in practice, that the most urgent symptoms, ascertained or even conjectured is of much more importance, as a guide to the use of remedies than the mere names of diseases. It is admitted that all the distinctions made in the classification of diseases are, to a certain extent, arbitrary, and contrary to the laws of Nature. It is not therefore possible to have a perfect knowledge, neither will it be any more so by the pathological classification of diseases."

"I think," says Elliotson, "we all make two inquiries in considering any case; the one is the *nature* of the disease, and the other is the *situation* of it. This is the utmost assistance, I think, that memory can have from arrangement, and this is the plan which is continually followed by *practical* writers."

Diseases may be treated *Locally*, *Generally*, and *Specialy*, or they may be classified into—I. GENERAL; II. UNIVERSAL; III. LOCAL.

This last method is adopted in the outline which follows. It is not proposed to treat separately the catalogue of diseases which afflict the human body—a *capite ad calcem*—"from head to heel," but under each of these three general heads, selections will be made, illustrating the Electropathic treatment.

GENERAL DISEASES.

General Diseases are such as may affect almost any

part of the body, varying their location; and such local diseases, as not being variable in the location, affect sensibly the whole body. From the general class we may select, for example,—

INFLAMMATION.

This general title comprises under it all diseases in which the four chief symptoms of morbid redness, swelling, morbid heat and pain are present, “*rubor et tumor, cum calore, et dolore.*” It alters not its nature whether it be primary or secondary. It is the most general of all diseases, attacking any part of the body that is vascular. It is seated in the capillaries, and is an excited state of the circulation, and probably no sensible diseased action of the body occurs unaccompanied by some degree of inflammation. Its causes may either exist in the general system, or be external. Feverish pain, which increases by pressure, is the symptomatic test of the existence of inflammation, whether it be located in the skin, the mucous membranes, the serous membranes, the cellular membranes, or the fibrous membranes.

COMMON TREATMENT.

Active inflammation, in all its varieties, has generally been treated by cold or warm applications externally, depletion by cupping, leeching and bleeding, counter irritation by sinapisms and blisters, and counter stimulation by cathartics, emetics, as digitalis, antimony, mercury, colchicum, and by sedatives, as opium in large doses.

In Chronic and Passive Inflammation the chief reliance has been placed in evacuants, generally mercury combined with opium, with only local depletion.

In Chronic Inflammation the treatment is varied by its

active or *passive* character, as local depletion by leeching, cupping, or bleeding, and by issues, setons, caustics, as nitrate of silver; or the treatment is antiphlogistic internally by mercury; or supporting or tranquilizing remedies are employed.

Specific Inflammation receives specific treatment.

ELECTROPATHIC TREATMENT.

Although electricity may be safely and beneficially used in connection with the common treatment, yet electropathy needs no adjunct, but regimen, such as the regulation of diet, temperature, and the external application, to the part, or to the whole body, of water in which has been dissolved a small quantity of common salt. This simple preparatory course of treatment is followed by the communication of electricity to the system generally, which has been found to fulfil all the indications of the common treatment by other remedies, without impairing the constitution, or weakening the vital energies of the system, but on the contrary, its influence has been found to be invigorating. It tranquilizes and supports the system, and has this advantage over the common treatment, that under its influence the system sustains neither external nor internal violence. Its office seems to be to sustain the recuperative power of the system in resisting the ravages of disease. Under general diseases might be treated Hæmorrhage, Profluvia, Dropsy, Deficient Secretions, Changes of Structure, Transformations of Structure, and New Formations, were this sketch designed to be a treatise.

II. UNIVERSAL DISEASES.

Besides those diseases which may affect almost any

part of the body, and such as not being common to any one part of the body, yet affect the whole body, which we have termed—General Diseases, it will be sufficiently definite to say, that, *by Universal Diseases, is meant,—such as without attacking any one particular locality, appear to be diffused throughout the whole body.* These are Anæmia, Chlorosis, Scurvy, Intermittent Fever, Continued Fever, and Remittent Fever.

To illustrate the Electropathic practice, in the treatment of the general class of universal diseases, we select Febrile Diseases, which must be treated under the general head of

FEVER.

Definition. Fever, from *febris*; from *fervere*, “to glow,”—“to be hot” or “pyrexia, from *πυρεξία*, *febricito*, from *πυρ*, “fire.” After a preliminary stage of languor, weakness, and defective appetite,—acceleration, or quickness of the pulse, increased heat, great debility of the limbs, and disturbance of most of the functions, without primary local disease,—may be said to constitute the first, chief, general symptoms of simple fever, or pyrexia.

Cause. The *predisposing* causes are general bad health, depression of spirits, age and sex. Infancy and old age are less liable to it than persons of middle age, and men more liable than women, owing perhaps to the difference in their manner of exposure.

The *exciting* cause may be assumed to be the exhalation from decaying vegetable matter, miasma, malaria, producing obstruction, tension, retention, and their concomitants.

COMMON TREATMENT.

By keeping the patient warm, and giving warm drinks, (not stimulants,) depletion by bleeding, opium, laudanum, cold ablutions, peruvian bark, quinina, arsenite of potassa, in the form of the tasteless ague-drop, arsenious acid, sulphate of zinc, oxide of zinc, sulphate of copper, and alum, muriate of ammonia, carbonate of potass,—emetics according to the circumstances of the case,—that form of fever commonly called *Ague*, is treated in common practice. A reference to one text-book will be equivalent to citing the authority of all.

In Continued Fever (one of those diseases communicated by *contagion*, except perhaps in its *typhoid* type) the treatment is *antiphlogistic*—as emetics, purgatives, blood-letting, blisters, mercury, antimony; and in certain stages, the treatment is *saline*, as carbonate of soda, nitre, muriate of soda, or chlorate of potass. Neutral salts, they say, make *black* blood, *scarlet*,—and acids and alkalies make *red* blood *black*. It should be added that at a certain stage, tonics, such as quinina, are employed. This embraces the leading features of the common treatment.

Remittent Fever, partaking of the character both of Intermittent and Continued Fever, the same general treatment is employed, according to symptoms; most generally it is treated as an Intermittent.

ELECTROPATHIC TREATMENT.

As fever is obstruction, and consequent inflammation, the treatment is an Electropathic Bath, (see this explained under its appropriate head,) with *gentle* and *uniform* FRICTION.

When attended by great thirst, cooling drinks, such as cold water, lemonade, either hot or cold, as the case requires, are given.

When attended by nausea or any disturbance of the stomach, or the alimentary canal, ELECTRIZATION is employed by passing electricity through the stomach, which at the same time acts upon all the viscera—the liver, diaphragm, spleen, mesentary glands and kidneys—thus regulating the alvine, urinary and other secretions.

Should this not allay the urgent symptoms, and the pulse still be above the natural standard, and the respiration still laborious, the course of electrization must be changed, so that its circuit shall be from the nape of the neck to the right and left iliac regions, and continued in a gentle stream, until urgent symptoms are allayed or disappear, always having regard to the age, sex and strength of the patient.

This treatment should be continued according to circumstances, until the disease shall have been mastered, and the health of the patient restored.

The electrization should not be repeated more than once or twice during each interval of 24 hours.

Each electrization may occupy from 15 minutes to an hour, or more, according to the circumstances of the case.

The duration of each electrization must be determined by the effects produced upon the patient during the operation, of which the patient will generally be sensible.

It should always cease, when the operator perceives either an evident dilatation of the pupil of the eye, or any profuse perspiration, or the pulse reduced to its natural standard ; or all of these indications combined. Any

one, or all of these combined, will show the degree of electrization, which never should be exceeded.

Within this limit, electrization is always safe, never dangerous or injurious ; but always attended with sanitary effects.

This course of treatment has been found to fulfill all the indications desirable of the curative art.

Electropathic treatment cures the disease—not by producing *another suffering different* from the disease, nor by giving medicine which would produce symptoms *similar* to the disease if given to the patient while in health, but by *relieving, removing, and destroying* the *suffering* of the patient ; which constitutes the disease ; thus restoring health, invigorating the system, strengthening the constitution, and leaving the patient, now restored to a healthy state, in a condition less liable to be attacked by disease, and more able, if attacked, to resist and repel its encroachments.

The whole treatment is pleasurable, and generally successful, when seasonably employed.

III. LOCAL DISEASES.

Local diseases are affections of particular parts of the body, not variable in their location, and which do not affect the whole body without regard to locality. Under this class is included all diseases : 1. Of the Nervous System. 2. Of the Respiratory Organs. 3. Of the Heart. 4. Of the Chylopoietic Viscera. 5. Of the Urinary Organs. 6. Of the Fibrous Tissues. 7. Of the Organs of Respiration. In the treatment of all diseases of this general class, the cure must be effected by communicating the electricity to the system GENERALLY, without

which, the cure cannot be radical, but merely a suspension of symptoms. It will also be proper and necessary to communicate electricity directly to the part in which the disease is located.

To illustrate the Electropathic treatment of local diseases, it is proper to repeat, that, the general principle is, that electrization must be communicated by acting *directly* upon the *organ* affected; but the electrization is always *general*, although local. This general rule will be an infallible guide to the practitioner.

Thus, if a disease be an affection of the Nervous System, the electrization may be performed: 1. By forming the circuit from the nape of the neck to the feet. 2. From the right side of the head near the temporal artery to the *left* iliac region. 3. From the left temporal artery to the *right* iliac region. Which electrization embraces in its circuit the lungs—the pulmonary circulation—the arch of the great aorta—the heart, and the other viscera contained within its circuit. The electrization will thus be made to act upon the mucous tissues, dissolving tubercles, and removing hepaticization, equalizing the circulation, regulating the secretions, and producing a determination to the surface; thus fulfilling all the indications of the curative process.

The electrical current must be directed according to the determination of the circulation to the part affected.

For example, if there be a determination of the blood to the head, producing too great a fulness on the brain, the electrical circuit must be formed by placing the *positive* pole of the conductors to the head and the *negative* pole to the feet. The observance of this rule in the com-

munication of electricity, in such cases, will generally, if not invariably, change the determination, which will manifest itself, by the removal of the symptoms, and by a glowing warmth at the extremities.

NERVOUS DISEASES.

Electrotherapy appropriates as entirely its own, the Nervous System; a position fully conceded to it, even by the most sceptical of medical authors.

Not only are the nervous tissues excellent conductors of electricity, but the blood, with its vascular tissues, and all the muscular fibres are also susceptible, in a high degree, to its influence.

When it is remembered that no morbid affection of any part of the human body, can develop itself to the senses, except through the medium of the nervous system, either by sensation or association, the conviction fastens itself strongly upon the reflecting mind, having any considerable knowledge of the animal economy of man, and of the marvellous power of electricity, that the influence of this most powerful and mysterious therapeutic agent, must necessarily, *a priori*, be exceedingly efficacious in the cure of disease.

Since the nervous tissues, the blood with its vascular tissues, and the muscular tissues, sustain a connection so intimate with all the organs and functions of the whole body, and the sympathetic correspondence between its several parts is so general, that if one part suffers, all the parts suffer, more or less, together, it is inferable, *a priori*, that whatever affects beneficially these media of communication between the several parts, must also be remedial to the whole human system, by aiding the *Vis Naturæ Medicatrix*.

The reasoning *a priori* has been fully justified by sufficient facts demonstrated in electro-therapeutic treatment.

A more general diffusion of the knowledge of these facts is all that is necessary to overcome the prejudices of the most sceptical.

PHTHISIS—CONSUMPTION.

Of the general class of Local Diseases, Phthisis may be selected as another example by which to illustrate the Electropathic treatment.

1. *Definition.*—Phthisis from $\varphi\theta\iota\omega$, “to consume,” has received the general name of Consumption, by which is meant, “a deposition of a scrofulous substance in the lung; and all the organic changes to which its presence, or the state which produces its presence, gives rise.”

2. *Symptoms.*—The general symptoms are, spitting of blood, which is frothy, scarlet, and mixed with air—a short tickling cough, which increases at night—a stitch in the side—the softness of the flesh—softness of the hair, which loses its strength—a feverish rest with a susceptibility of more sudden and greater acceleration of the pulse—sweating in sleep in only one part of the body—expectoration of mucus, streaked with blood—these symptoms indicate its First Stage.

When these symptoms become more aggravated, with debility, languor, palor, and a pleuritic pain in the side, (and in female patients, a decline and discoloration of the tamencaia,) incurvation of the nails—falling off of the hair—the sputa greenish or yellowish, fetid and more abundant, and not so long and stringy, and so heavy as to sink in water, with whitish curdy, fragmentary shreds, some-

times containing earthy matter; the tongue is either loaded with mucus, foul and yellow, or red at the tip and edges, or may remain in a healthy condition, but not usually. These are symptomatic of the Second Stage.

An increase in the pulse at noon, and particularly in the evening, and at every meal a great heightening of the pulse, accompanied with heat in the body; the urine deposits a pink sediment, and the pulse is *constantly* much higher than it should be, seldom below ninety, and often above a hundred—with *hopefulness* to the last, invariably; with unimpaired mind, appetite and digestion—colliquative purging and sweating—the hectic flush—and all the symptoms show the *Hectic Stage*.

The auscultatory and stethoscopic signs, and that of percussion are here omitted, closing with the silvery, ringing metallic sound, when the patient coughs, speaks, or breathes. To pursue all the changes and complications is needless here.

3. *Causes*.—Constitutional and hereditary predisposition, (persons from eighteen to thirty, being more liable to it,) bad food, bad lodging, and bad clothing, and bad air, or alternations from hot to cold, or from cold to hot temperature, may all be *producing causes*.

The *immediate causes*, are the same which produce common catarrh or cold, also exhaustion, either mental or physical, or both—powdery substances in the air—the presence of other diseases—sedentary habits—excessive use of the organs of speech, and of breathing—excessive venery.

COMMON TREATMENT.

Besides regimen, such as regulating the diet, tempera-

ture, clothing, and change to warmer climate; the treatment is varied according to symptoms and circumstances. It is generally *antiphlogistic*, such as cupping, bleeding moderately, blistering, sinapisms, emetics, digitalis, iodine, tonics, baths, anodynes, inhalations of drugs, and counter-irritants.

ELECTROPATHIC TREATMENT.

The object of whatever treatment, seems clearly to be to promote the biliary secretion; to diminish abdominal congestion; to equalize the circulation; to prevent localization of the disease; to augment and eject the bronchial secretion, and to prevent the accumulation and retention of the deposit which constitutes the disease.

Phthisis, or consumption, being primarily a local affection of the lung, the electrization is performed by embracing that organ within its circuit, by placing the positive pole of the conductor over the lung, and the other on the nape of the neck, the feet, or the lumbar region, or in the hand of the opposite arm.

The electropathic bath can also be beneficially used.

This treatment stimulates the organs of respiration to the performance of their functions, promotes the biliary secretion, removes the obstructions, promotes the discharge of the morbid accumulation, determines the circulation to the surface, equalizes it, quickens the action of all the vital organs and functions, prevents, or dissolves and discharges, by expectoration, tubercular deposits and formations, tranquilizes the system, and subdues the cough, regulates the pulse and the perspiration, both sensible and insensible.

As a test of the morbid state of the lungs, electriza-

tion is superior to the combined signs of auscultation, percussion, the stethoscope, and to all other means for detecting the degree and nature of the morbid affection.

A very little experimental practice, by the experienced physician, in this disease, by *electrization*, would satisfy the most scrupulous of its superiority, not only in diagnosis and prognosis, but in its power to remove symptoms by a process, no less mild, certain and natural in its effects, than it is simple and mysterious in its operation.

If there be any disease, more than other, in which the office of the physician should be to *assist nature*, in its recuperative efforts, consumption belongs to that class.

Of all other systems of treatment, the Electropathic is most pleasurable in its operations, and in its immediate and ultimate effects, and satisfies the patient, the watchful observer, and the practitioner, of its curative efficacy.

A patient, once under its influence for any considerable period, would with difficulty be induced to rely so strongly upon any other remedial agent.

Having shown briefly the Electro-Therapeutic treatment of disease by one or more examples under each of the three general classes of: 1. General; 2. Universal; 3. Local Diseases, it may be farther illustrated by showing the treatment in certain diseases without respect to classification. Among these may be named

CHOLERA.

Definition.—This definition will be restricted to the *Asiatic* cholera, which is distinguishable from common cholera, by the rice-water appearance of the evacuations.

Causes.—Want of organic strength in the system, amounts to a predisposition to cholera, by whatever causes the want of organic strength may have been produced, such as excess in eating, drinking, labor, exercise, emotion, passion, exposure, particularly to cold, bad air, bad food, or want of food.

What the *immediate*, exciting, absolute cause of cholera is, has not been demonstrated.

Nature of the Disease.—In this disease, there is a violent irritation of the mucous lining of the stomach and small intestines, and of the liver and spinal marrow, and also of the heart, with violent spasms in the ganglionic nerves, attended with exhaustion of the strength of the system, finally collapse. Its course is stealthy, sudden, and rapid in its termination in relief or death.

COMMON TREATMENT.

It cannot be truthfully said, that there is any *common* treatment in this disease. The treatment being almost as various as the number of the practitioners, and often varied even by the same practitioner.

ELECTROPATHIC TREATMENT.

Dr. Duncan, of Edinburgh, treats cholera by giving first a tea-spoonful of spirits of hartshorn, in a wine-glassful of water, giving immediately after 5 drops of camphorated spirits in a tea-spoonful of cold water and sugar, repeating the dose of camphor every 5 minutes, until 3 doses have been given.

The tincture of camphor is prepared by dissolving $\frac{1}{4}$ oz. camphor in $1\frac{1}{2}$ oz. spts. wine.

After an interval of 15 minutes, after giving the last

dose of camphor, during which time he keeps the patient under the influence of voltaic electricity, forming the circle from the left side of the neck to the right hypogastrium, a little above the pubic region.

After the electrization, he resorts again to the camphor for half an hour, unless the symptoms of returning health appear; when he gives one more dose of camphor, to perfect the cure, continuing the electrization until the patient perspires freely, upon which health and life much depend.

If the patient be first prepared for this treatment, by being placed in the electropathic bath, (see Electropathic Bath,) accompanied with friction, it may be claimed as strictly Electro-Therapeutic.

Or the Electropathic bath, with gentle friction, and general electrization without the camphor or hartshorn, will be quite sufficient in most cases.

INSANITY.

“It is not true,” says Dr. Rush, “that mania originates exclusively in the mind, because the mind is incapable of morbid operations, independently of impressions communicated to it through the medium of the body, and that there are no instances of primary affections of the mind, such as grief, love, anger or despair, producing madness, until they had induced some obvious changes in the body, such as wakefulness, a full or frequent pulse, costiveness, and other symptoms of bodily indisposition. This disease, then, is as clearly *physical* as consumption, erysipelas or rheumatism, and as fully under the control of the proper treatment as other morbid affections.” It must be a pleasing reflection to every friend of suffering humanity, that the barbarous and horrible treatment of

insanity by the straight-jacket, chains, dungeons, and the cruel lash, has been generally abandoned in all civilized nations, and KINDNESS, with gentle and humane remedies, have been adopted successfully in the radical cure of mania. Even the Antiphlogistic treatment, by bleeding, blisters, purgatives, emetics and narcotics, has found a substitute of superior curative efficacy in the Electropathic treatment. By this treatment, without violence, either to body or mind, and without debilitating the unfortunate patient, electricity, without intensity, shock, spark or pain, fulfils all the indications of the healing art in all cases of insanity, if seasonably and properly applied.

CONCLUDING OBSERVATIONS ON DISEASE AND REMEDY IN GENERAL.

In the prevention and relief of diseases peculiar to the female constitution, including Gestation and Parturition, Electro-Therapeutic treatment *locally, generally and specifically*, upon general principles, may be said with truth, to fulfill all the indications valuable in any other treatment, without discomfort or violence to nature, and with the utmost safety and certainty.

Here indeed is its appropriate field of triumph. By aiding nature to perform rightly its functions it does all that medical aid can do. By attempting to do more, by substituting artificial treatment, infinitely more mischief than good is the direful consequence.

The limits of this sketch will not allow any more extensive observations, excepting to add, that Electro-Therapeutic treatment is equally beneficial to all the diseases of infancy and of riper years.

GENERAL RULES AND DIRECTIONS.

I. TO PUT THE BATTERY IN ACTION.

1. One ounce of sulphate of copper dissolved in a sufficient quantity of water to fill one cell, is the best proportion.

2. Sulphuric acid diluted with water in the ratio of one part of acid to thirty parts of water, in quantity sufficient to fill one cell, is the proportion for each porous cell or diaphragm.

3. The cells being thus filled with their proper solutions, the battery is ready to be formed, by its proper dissimilar metals, and the graduation of its influence is produced, at will, by the operator, as an examination of the arrangement of the battery will make, at once, apparent to the most casual observer.

II. TO PUT THE INSTRUMENT IN ACTION.

The battery being thus put in action is then attached to the Magnetic Battery by proper conductors, the equilibrium of its current being disturbed by an alternate conducting and non-conducting wheel, rotated by clock-work put in motion by a spring wound up.

III. TO OPERATE.

The instrument is now ready for operation, by placing the patient within its circuit, by means of a proper conducting medium. The pole of the conductor attached to the copper end of the battery is the *positive* pole, and that communicating with the zinc end is the *negative* pole, of Olmstead's Improved Voltaic Arrangement for Medical Purposes.

IV. VARIATIONS IN OPERATING.

To operate directly upon any particular part of the body, the part affected must be made the point of contact of the pole of one of the conductors, in forming the circuit. The electricity will pass directly to the point of the body, in contact with the pole of the other conductor. This comprehensive rule is a sufficient guide in operations however various.

V. CAUTION.

Care must be taken to keep the instrument *clean*, and to replace the *old* solutions, when exhausted, by *fresh* solutions.

VI. GRADUATION.

In electrization, the universal law of Electropathy requires that the degree shall be so regulated that the patient shall *never*, in any case, experience *painful* sensations under its influence.

The whole system of Electropathy and Olmstead's Improved Voltaic Arrangement for Medical Purposes is based upon this fundamental principle, viz:

That nature never indicates violence in the cure of disease, and consequently, that electricity should never be communicated by shocks, or sparks, or by intensity, which always gives more or less pain to the patient.

In fact all the ideas associated with the use of the OLD ELECTRICAL MACHINES, must be *unlearned* and *reversed*, in *these* particulars, to understand and to appreciate Electropathy, which *never* electrizes, *but in a gentle, even, flowing stream, without pain*.

The only *exception* to this rule, is, that when the pores of the skin are obstructed, the patient may feel, *in*

the beginning of the operation, a *prickling* sensation, which, however, wholly disappears, as soon as the current passes the skin, and the circuit of the current is formed.

VII. ELECTROPATHIC BATH.

The Electropathic Bath is thus formed: A common bathing tub is filled sufficiently with cold, tepid, or warm water, as the case may require, in which is dissolved common salt, in the proportion of two ounces of salt to a gallon of water.

The two poles of the conductors of Olmstead's LARGE* Improved Voltaic Arrangement, are then placed in the water at the opposite ends of the vessel.

The salt water is thus electrified, during which electrification, the patient is bathed.

This constitutes the Electropathic Bath.

The patient may remain in the bath from ten to thirty minutes, according to circumstances.

The position of the positive and negative poles of the conductors may be changed so that the current of electricity may pass from either end of the bath.

This bath may be used beneficially, either in health or disease, by persons of every age and sex, and at all seasons of the year.

It is preservative of health, preventive of disease, and greatly aids in the cure of disease.

It produces always pleasant and grateful sensations, and is delicious.

* The battery used in operating on patients is too small to electrize properly the bath.

VIII. ELECTROPATHIC REGIMEN.

In the Electropathic treatment, the regimen must be strictly observed in the following particulars.

1. *Air*.—The breathing of pure, fresh air, is essential.

2. *Temperature*.—All exposure to alternations of temperature from cold to hot, or from hot to cold, should be guarded against as much as possible. This is important.

3. *Exercise*.—If the patient be in a condition to bear it, *moderate* and *regular* exercise should be taken daily in the open air, by walking, or riding on horseback, or in open carriage in *pleasant* weather.

Within-door Exercise.—This is even more important to all patients.

After undressing at night, and *before* dressing in the morning, as *regularly* as they should offer their morning and evening prayers, should this exercise be performed.

Thus.—Standing erect and firm upon both feet, expand the chest so as to give full play to the lungs, by bringing the arms from their usual hanging posture so as to describe a continuous straight line with the points of the shoulders, flexing the fore-arms to right angles with each other, with the fists clenched. While in this posture, the arms are to be thrown with a rapid motion backwards and forwards, constantly, from five to fifteen minutes.

The left hand is then placed on the right side, or the right hand on the left side, alternately, and the opposite foot brought to an angle with the toes of the other foot, and throwing up the other arm quickly to a perpendicular line above the head, at each elevation of the arm, bending the knees. This motion is to be repeated constantly from two to five minutes.

In *pulmonary* diseases this *in-door exercise* should never be omitted night or morning.

Indeed, to persons in health, particularly growing youth, especially young females, it is of the most vital importance, in giving expansion to the chest, and rotundity of bust, and healthful, beautiful forms.

4. *Diet.*—By electrization through the stomach, the gastric secretion will always be rendered healthy, and capable of digesting and assimilating, reasonable portions of any food found commonly to agree with the patient while in health.

5. *Excitement.*—Whatever is calculated to excite any of the passions to excess, should be studiously avoided.

6. *Cheerfulness.*—The patient should study to be cheerful, as undue anxiety is extremely injurious.

APPENDIX.

TESTIMONIALS OF THE ADAPTATION OF OLMSTEAD'S IMPROVED VOLTAIC ARRANGEMENT FOR MEDICAL PURPOSES, IN THE ELECTROPATHIC TREATMENT OF DISEASES.

An array of certificates is deemed unnecessary, and, therefore, in this Appendix, scarce half a dozen of the multitude in the possession of the author, inventor, and patentee, will be copied.

No. 1. Copy of the Testimonial of Dr. Crandal and others.

This certifies that I have examined with much care and attention, a galvanic battery, invented by Dr. AD. Olmstead, and intended to be used as a medical agent in the cure of disease, and am fully satisfied that, for convenience of use, and adaptation to the end sought, it is superior to any battery with which I am acquainted.

EDWARD CRANDAL, M. D.

EASTON, *June 17th*, 1848.

I fully concur in the above opinion, and being intimately acquainted with Dr. AD. Olmstead, feel it a pleasure in advancing his interest, as well as the interest of the profession by my endorsement.

JNO. P. B. SLOAN, M. D.

EASTON, *June 30*, 1848.

I fully concur in the above opinion.

W. F. SMITH, M. D.

E. PARKS, M. D.

J. BLACKMAN, M. D.

R. BAKER, M. D.

P. CLARK, M. D.

No. 2. Copy of Dr. Cook's Testimonial, and a cure reported.

EASTON, PA., June 12th, 1849.

DR. AD. OLMSTEAD,

DEAR SIR :—I have just visited our patient, E. Unaungst, whom I handed over to you on the 13th of April last, *unable to talk, walk, stand, or sit alone*, in consequence of an attack of Chorea, caused by a fright which she experienced, one and a half years since.

Although I was not surprised, yet I was highly gratified to find that all those muscles which had remained inactive for months previous to your taking charge of her, were restored to a perfectly healthy state, and that the patient, instead of being confined to her bed, as I had been wont to see her, was actively employed about the house.

As a curative agent, I am satisfied that Electricity is not as much appreciated by the profession as it deserves. It is to be presumed, however, that the repetition of such cures as the case now in question, and which you have been instrumental in effecting, will have, if made public, a tendency to arrest the attention of Physicians, and cause them to look to Electricity more frequently as a remedy, especially in those lingering diseases which are principally dependent upon a deranged state of the nervous system.

That Electricity may be most successfully used as a remedy in diseases, it is not only important that it be passed through the parts affected, in an even continuous stream, but that it be completely under the control of the operator, so that a greater or less quantity of the fluid may be introduced, as the case may require.

For the accomplishment of these purposes, I am clear in saying from personal experience, that your machine in your experienced hands, is admirably adapted.

That you may continue to receive the patronage you so richly deserve, is the earnest wish of your friend.

SILAS C. COOK, M. D.

CIRCULAR.

Electricity, as a therapeutic agent of great power in controlling diseases, has been known and acknowledged by the intelligent portion of the Faculty of Medicine for the last hundred years. Subsequent to the year 1800, its supremacy has been transferred to another science, called Galvanism, or Voltaic Electricity.

The Subscriber, from many years' practice in the application of this powerful agent for the cure of diseases, found by experience that to *secure success*, two great principles must be attained.

1st.—A Battery must be constructed, so that *DEPENDENCE* can always be placed on its *ACTION*.

2d.—It must be arranged so as to give the most *entire control over the quantity or power of its influence*.

In OLMSTEAD'S Improved Voltaic arrangement these two most important principles are fully combined, and will be found superior to any other form of battery. By this arrangement the electric influence is brought entirely under the control of the operator. He can give it off with such exact precision as to reach any case and every susceptibility, without the least danger of injury, either to the young or old, male or female, delicate or robust. Its application is always valuable to the sick—it supports the constitution, and enervates the vital powers of the system to overcome the ravages of disease, and it perpetuates health to the healthy.

ELECTROPATHIC RULES.

- 1.—All operations paid for on commencing.
- 2.—The time required for electrization is from 5 to 60 minutes.
- 3.—Use of Electropathic bath, from 10 to 30 minutes.
- 4.—Pressure with brisk friction, to excite the electro-biological circuit, from 5 to 25 minutes.
- 5.—After which electrization, from 2 to 5 minutes.
- 6.—No gentlemen admitted during the hours appropriated to ladies.
- 7.—A card of address is required previous to commencing.
- 8.—Particular attention given to the eye and ear, and to nervous and chronic affections.
- 9.—No responsibility will be taken unless patients adhere strictly to the rules prescribed.
- 10.—Persons unable to pay will receive attention gratuitously.
- 11.—Office 367 Broadway, N. Y.

DR. OLMSTEAD, Electropathist.

RATES OF CHARGES.

- | | |
|--|----------------|
| 1.—For each electrization, | \$1 00 |
| 2.—For Electropathic bath, | \$1 00 to 5 00 |
| 3.—For exciting the electro-biological circuit, &c. | 1 00 to 3 00 |
| 4.—For visits, | 1 00 to 5 00 |
| 5.—For advice, | 1 00 |
| 6.—For consultation, | 5 00 |
| 7.—Lessons of instruction, in the art of Electropathy, given if requested. | |
| 8.—The number will be limited. | |
| 9.—Single lessons from | 15 00 to 25 00 |
| 10.—Office open at all hours of the day. | |
| 11.—Night calls extra. | |

✉ All communications, *post paid*, addressed to DR. AD. OLMSTEAD, either at Easton, Pa., or at 77 Fulton-street, New York, care of T. Smith & Co., will receive prompt attention.

25 PER CENT SAVED!!

T. SMITH & CO.,

77 FULTON-STREET,

ONE DOOR FROM GOLD-STREET.

MANUFACTURERS AND DEALERS IN

Plain and Japanned

**TIN WARE, BRITANNIA WARE,
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House-keeping Articles of every variety.

Selected with the greatest care, with the view of suiting the most fastidious and delicate taste; and being the manufacturers of the most useful and staple kinds, we can afford to sell at

VERY LOW PRICES, AND WARRANTED GOOD.

Hotels, Dining Saloons, Packet Ships, and Steamboats fitted out at the shortest notice, with every thing needed in our line. Also,

PROPRIETORS OF SMITH'S EAST INDIA WATER COOLER,

With Filters attached, or not, as required.

An article that has been used in the East Indies with the greatest success, for keeping water cold for several days, with only a *small piece* of Ice, at the same time, by the addition of the Filter, it is rendered *clear* and *pure*, so very desirable for drinking, combining together luxury and health.

MANUFACTURERS OF

THE EAST INDIA PATENT REFRIGERATOR,

WHICH WILL PRESERVE ICE SIX MONTHS IN HOT CLIMATES.

Families, Hotel Keepers, Grocers, &c., will find this Refrigerator a most useful and indispensable article,—indeed they will not be without one, after being made acquainted with its many superior advantages. They are so constructed that there is a large closet with shelves, each side the ice house, receiving cold air continually, which keeps its contents in a delightful manner, in the warmest temperature. This article has given such perfect satisfaction, that we desire to call particular attention to it.

RULES AND DIRECTIONS

FOR USING

OLMSTEAD'S IMPROVED VOLTAIC ARRANGEMENT

FOR

TELEGRAPHIC PURPOSES,

PATENTED APRIL 17, 1849.

1.—SOLUTIONS.—Fill the Gutta Percha cells with a saturated solution of the sulphate of copper, which is made by adding boiling water to a superabundance of the crystals. This solution must not be poured into the cells until entirely cold, or it will, by its heat, dissolve the Gutta Percha. To prevent exhaustion, and to supply waste, let crystals of the sulphate of copper be added, or throw out the old, and replace with a new solution.

2.—For the porous cells, pure concentrated sulphuric acid must be added to pure soft water, in the proportion of one part acid to thirty parts water. If not found to act sufficiently strong, add more of the acid, but not so much as to produce effervescence. If the action is not then perfect, throw the old away, washing the porous cells clean, and replace with new acidulated water as above directed, and the Battery will work well.

3.—The conducting cover must then be fitted on properly.

4.—The wooden keys are then to be put in their places, so as to form a perfect contact between the negative metal (copper), and the conductors upon the perforated cover.

5.—The positive metal (zinc) is then placed in the porous cells through the perforated cover, so as to form

a firm contact with the conducting wires, which puts the Battery in action.

6.—The copper is the negative metal, but forms the positive end of the Battery. The zinc is the positive metal, but forms the negative end of the Battery. Screw cups are attached to their respective metals, for the reception of the wires forming the poles of the Battery, so as to complete the circuit. When several main Batteries are used in connection on the same line, care should be taken to connect them, so as to give a uniform direction to its influence, otherwise they will neutralize and no circuit will be formed.

7.—The Battery should always be kept level, so that the solutions may always act uniform upon the metals.

8.—The zinc must be properly amalgamated, and kept clean and bright.

9.—The contacts must be kept free from corrosion, bright and clean, or they will not be perfect, consequently the Battery cannot act well.

10.—The solutions must be kept from any foreign matter, and renewed when the battery does not act well; in doing which, both the positive and negative metals must be cleansed from all corrosion and foreign matter which may adhere to them.

11.—It must be repeated that the sulphuric acid must be pure, and kept from any admixture, especially with *nitric acid*.

12.—No other acid is admissible in the diluted solution than pure sulphuric in putting this Battery in action.

13.—These rules and directions must be fully adhered to; by doing so, the action of the Battery can always be relied upon; it will never deceive the operator, and he will find it superior in every respect to any other in use.